WASTE MANAGEMENT

GUADALUPE RUBBISH
DISPOSAL CO., INC.
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December 28, 2010

Ms. Carrie Austin
Project Manager
Regional Water Quality Control Board
SF Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

RE: Water Code Section 13267 Technical Report on Erosion of Mercury Mining Waste, Guadalupe Recycling and Disposal Facility - 15999 Guadalupe Mines Road, San Jose, California

Dear Ms. Austin,

Guadalupe Recycling and Disposal Facility (GRDF) is pleased to provide the attached report concerning the potential for erosion of mercury mining waste at the above-referenced facility. The report was prepared by Stantec Consulting Corporation to fulfill a request from the California Regional Water Quality Control Board, San Francisco Bay Region for additional information as outlined in a letter to GRDF dated June 18, 2009.

If you have any questions regarding the information provided, please do not hesitate to contact me at 916-294-4162 or Ms. Becky Azevedo at 408-268-1670.

Sincerely,
Guadalupe Recycling and Disposal Facility

James Obereiner

Attachment: Technical Report on Erosion of Mercury Mining Wastes at Guadalupe Mercury Mine.

cc: Bill Spence, Guadalupe Recycling and Disposal Facility
Andrew Kenefick, Waste Management
Jack Hardin, Stantec Consulting Corporation

Stantec

Stantec Consulting Corporation
15575 Los Gatos Boulevard Building C
Los Gatos CA 95032
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December 23, 2010

Carrie M. Austin, Project Manager
Regional Water Quality Control Board, San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

RE: Water Code Section 13267 Technical Report on Erosion of Mercury Mining Wastes at Guadalupe Mercury Mine, Santa Clara County
Guadalupe Recycling and Disposal Facility, San Jose, CA

Dear Carrie:

On behalf of Guadalupe Recycling and Disposal Facility (GRDF), this technical report presents Stantec Consulting Corporation's (Stantec's) findings of a field evaluation of mining waste and their potential to erode into surface water at the former Guadalupe Mercury Mine (the Site) area in San Jose, California. Preparation of this technical report was requested by the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board) in a letter to Guadalupe Rubbish Disposal Company, Inc. (GRDC) dated June 18, 2009. The request for a technical report addressing potential erosion of mining waste at the Site was made pursuant to California Water Code Section 13267, as part of the planned implementation of Guadalupe River watershed mercury Total Maximum Daily Load (TMDL) project. Under the TMDL Implementation Plan, the goal for abandoned mercury mines is to restore the landscape to nearly natural erosion rates through reasonable and feasible means.

Field mapping and mine waste evaluation activities for this technical report were conducted by Stantec between March 2009 and October 2010. All work described herein has been conducted under the direct supervision of a California Professional Geologist.

OBJECTIVE

The primary objective of this phase of work was to evaluate the surface distribution of residual mining waste at the Site and the potential for erosion of mining waste and transport of suspended sediments to Guadalupe Creek (the Creek). Specific requirements for this report were set forth in the Technical Report Requirements contained in the June 18, 2009 Water Board letter, and include:

1. Description and detailed map (including topography) for the parcels of land GRDC owns, showing the:
    - Geology, including soil types, locations of seeps, and landslides
    - Historic locations of mining and/or ore processing
    - Current locations of mining wastes and locations of seeps

2. Description and detailed map (including topography) showing the results of your investigation of the potential for mercury mining wastes to erode (e.g., gullies and surface erosion from stormwater, discharge from seeps, slumps, or landslides) into surface waters (for the parcels specified in 1). Describe and map in detail the current locations of mining wastes, seeps, and landslides and the potential for mining wastes to erode into surface waters. Rank the risk of discharge into surface water for each site by erosion potential, effect of seep, and bioavailability of mining waste.

   Rank erosion potential as follows:

   • high (currently eroding into surface waters, e.g., surface erosion, gullies, slumps, and landslides)

   • medium-high (susceptible to mass wasting from gullies, slumps, and landslides)

   • medium-low (susceptible to surface erosion)

   • low (located greater than 100 meters from surface water, stable slope and little evidence of surface erosion).

   Rank effect of seeps (whether from tunnel seeps or natural springs) for potential to erode mining waste as follows:

   • high (seep discharge flows to an area of obviously eroding mining waste)

   • medium-high (seep originates in mining waste)

   • medium-low (seep discharge contains mining waste and flows to a pond or wetland area)

   • low (seep does not discharge or erode mining waste, and seep is rarely hydraulically connected to creeks).

   Rank bioavailability of mining waste as follows:

   • high (heat-processed wastes including calcines and elemental mercury, and contaminated soils in processing areas)

   • low (overburden and rocks).

3. In general terms, based on observations made during the investigation, describe the appropriate controls necessary to contain (stabilize) the eroding mining wastes, or potentially eroding wastes, from reaching surface waters for the parcels specified in 1 above. Examples of observations and associated appropriate controls include: landslide will require geotechnical investigation, large slump will require extensive grading, or minor surface grading and revegetation is needed.

SCOPE OF WORK

The former Guadalupe Mine occupies a portion of a larger property owned by GRDF and operated as a municipal waste landfill (Figure 1). For the purposes of this report, the study area was defined as the boundaries mapped on the subject property by the U.S. Geological Survey (USGS) in Professional Paper No. 360 (Bailey, et al, 1964). Because the original mine site has been extensively reclaimed and the mining structures removed, previous consultants have relied on the map of the Guadalupe Mine (Plate 14) prepared by the USGS during or shortly following active mining operations at the Site. The limits of current surface mapping and field evaluation of mining waste are shown on Figure 2. The mapping area does not extend beyond the subject property boundaries.

Mining waste is defined in California Code of Regulations Title 27 (27 CCR), Chapter 7 as waste from the mining and processing of ores and mineral commodities, including (1) overburden; (2) natural geologic materials which have been removed or relocated but have not been processed (waste rock); and, (3) the solid residues, sludges, and liquids from the processing of ores and mineral commodities. For mercury mines in the Guadalupe River watershed, the TMDL Staff Report prepared by the Water Board identifies mining waste to include processed ores originally placed in dumps or commonly used for road base, mercury-contaminated soils in former processing areas, and overburden from surface and underground workings.

The scope of work involved in the preparation of this report included the following generalized tasks:

- Review of available historical aerial photographs and topographic maps, and the geologic and mining operations maps prepared by the USGS, as of 1947 for the mine;
- Review of recent topographic mapping and surface geologic mapping conducted by previous consultants;
- Field evaluation of the presence and extent of mining waste mapped by previous consultants;
- Field evaluation of the types of mining waste exposed at the surface and classification of wastes, as defined above;
- Evaluation of the potential for mining wastes to erode based on proximity to surface water, storm water runoff patterns, slope angle, existing vegetation, presence of seeps and springs, and evidence of mass wasting processes;
- A preliminary evaluation of the bioavailability of mercury in mining wastes should they be transported to surface waters of the Creek through erosion processes; and
- Preparation of this technical report of findings.

SITE DESCRIPTION AND ENVIRONMENTAL SETTING

General Site Description

The GRDF owns and operates a municipal solid waste landfill and supporting facilities in San Jose, California on a portion of a 411-acre property (Figure 1). The property straddles the Capitancillos Ridge in the western foothills of coastal mountains which flank the southern Santa Clara Valley. Approximately 150 acres of the eastern and central portions of the GRDC property are occupied by the landfill and a variety of recycling facilities, and the remaining acreage is primarily open space (Figure 2). The southeastern portion of the property was formerly the location of the Guadalupe Mercury Mine and is bounded on the southwest by the Creek.

The topography of the former mine area is characterized by an incised stream channel along the Creek, a gently sloping terrace along the northern side of the Creek, and steep upland slopes that extend to the top of the ridge. Surface elevations across the Site range from approximately 380 feet above sea level along the Creek in the southwestern portion of the mine area to 750 feet at the ridgeline in the northern portion of the Site. Native vegetation consists of oak woodland habitat and chaparral in the upland areas and riparian habitat along the Creek.

Formerly disturbed areas of the Site are predominantly vegetated with native and non-native grasses, clover, and brush.

From the recycling area and green waste storage yard associated with the landfill, an unpaved road leads downward across the terraced slope to the former mine areas (see Figure 2). Near the base of the slope, the road forks to the east and leads downward to a storage area for truck roll-off bins. Also located in this general area are a former residence and outbuildings and two water storage tanks for the landfill supply well. The main portion of the access road continues westerly to a level area occupied by a historic brick building associated with the former mine and a newer storage building used to support the landfill operations. The access road represents the eastern extension of the original Guadalupe Mines Road, which is now closed to public access across the Site.

Geologic Setting

The Site is located in the northern Coast Ranges geomorphic province of California (Norris and Webb, 1990). The Coast Ranges extend from San Francisco Bay southward to the Santa Ynez River in Santa Barbara County. The eastern boundary of the Coast Ranges is the Central Valley and the western boundary extends offshore into the Pacific Ocean. The Coast Ranges are characterized by northwest-southeast trending mountain ranges and intervening valleys which are generally separated by faults and dominate the physiographic expression of the region.

The property is located in the Guadalupe River watershed on the northeastern flanks of the Santa Cruz Mountains. Bedrock exposed at the Site is assigned to the Jurassic-Cretaceous age Franciscan Formation. Dominant rock types within the Franciscan Formation include serpentinite, metavolcanic rocks such as greenstone, and greywacke sandstone. Locally, Tertiary age hydrothermal alteration of the serpentine-rich rocks has produced a silica-carbonate rock which is the host rock for most of the mercury ore (cinnabar) mined in the New Almaden Mining District, which includes the Site.

Hydrogeologic Setting

For planning purposes, the Water Board includes the Site in the Santa Clara sub-basin of the Santa Clara Valley groundwater basin. However, at the Site, water-bearing alluvium is limited to the immediate areas flanking the Creek. The GRDF operates a water well located approximately 270 feet north of the Creek which provides water for landfill operations.

Away from the Creek, the slopes are predominantly underlain by bedrock of the Franciscan Formation. The Franciscan Formation rocks are considered to be essentially non-water bearing, however limited volumes of groundwater may be present in fractures within the bedrock. In the Coast Ranges, naturally occurring springs and seeps are not uncommon on slopes underlain by Franciscan Formation rocks.

PROJECT BACKGROUND

This section briefly summarizes the history of the mine, current regulatory environment, and previous environmental investigation conducted by GRDF.

Site History

The Guadalupe quicksilver mine, as mapped by the USGS (1964), originally occupied approximately 1,800 acres in the valley of the Creek and along the adjacent Los Capitancillos Ridge. In 1948, the USGS noted that the mine contained several dwellings and a reduction plant with a rotary furnace having a daily capacity of 60 to 80 tons of ore. The total recorded production of the Guadalupe mine to the end of 1947 was 92,623 flasks. Adding the 20,000 flasks reported to have been produced between 1854 and 1875 but not recorded; the total claimed production is greater than 112,600 flasks of mercury. Like many other old mercury mines in the Coast Ranges, it was operated intermittently, and it yielded two-thirds of its entire output during the second of its four main periods of production between 1875 and 1885. The last period of operation was from 1930 to 1947. In 1947, the Laco Mining Co. gave up its lease, after having recovered only 3,499 flasks during its 12-year period of operation. By 1948, the mine was idle.

Previous Work

On October 18, 2007 representatives of the Water Board visited the GRDF property to inspect storm water runoff controls along the western slope of the ridge and to examine former mining operational areas. As a part of this visit, Water Board representatives examined stream banks adjacent to the northeastern side of the Creek and noted areas where surface vegetation was not present and the underlying soils exposed.

Detailed mapping and a description of the observed areas of concern was conducted by AECOM, formerly Earth Tech, Inc., consultant to GRDF, in December, 2007. \Due to the expected onset of winter rains and concerns raised by the Water Board regarding erodibility of the exposed areas, GRDF placed interim soil stabilization measures at a majority of the identified areas.

In April 2008, GRDF submitted a *Work Plan for Stormwater Best Management Practices* to the Water Board. The work plan, prepared by AECOM, provided map locations, photographs and detailed descriptions of exposed soil locations designated as Area 1 through Area 11 along the Creek and outlined a phased approach to implementing restoration measures. The work plan also outlined preliminary tasks and field mapping activities necessary to develop a technical plan for mine waste characterization, as previously requested by the Water Board.

In a letter to GRDF dated February 3, 2009, the Water Board provided comments on the aforementioned work plan and requested additional details for design and installation of best management practices (BMPs) for erosion control. The Water Board also requested that GRDF review specific permit and guidance documents and incorporate applicable information into a revised work plan. In response, GRDF submitted a revised work plan prepared by Stantec to the Water Board on June 2, 2009. In correspondence dated June 18, 2009, the Water Board approved the proposed restoration work for the exposed soil locations designated as Phase 1 Areas (1, 3, 5, 7, and 8).

In separate correspondence dated June 18, 2009, the Water Board requested submittal of a technical report addressing erosion of mining waste at the Site pursuant to California Water Code (CWC) Section 13267.

In October 2009, GRDF implemented the erosion and sedimentation BMPs for the Phase 1 Areas described in the June 2009 work plan approved by the Water Board. In September 2010, GRDF submitted a work plan addendum prepared by Stantec to the Water Board which addressed enhanced interim erosion and sedimentation BMPs for the Phase 2 Areas. Included as appendices to the September 2010 work plan addendum was a BMP construction completion report for the Phase 1 Areas BMPs documenting the work completed in October 2009. Also included as an appendix to the work plan addendum was a detailed geologic inspection report for Area 11, as proposed in the June 2, 2009 work plan. The proposed erosion and sedimentation BMPs for the Phase 2 Areas were completed in October 2010.

FIELD INVESTIGATIVE METHODS

This section presents a description of the methodologies employed to evaluate mining waste at the Site and their potential for erosion and transport to surface waters.

Existing Map Review

A detailed topographic map of the Site prepared by AECOM in 2007 was provided to Stantec and used as the base map for field mapping and mine waste evaluation activities. AECOM also prepared a surface geology and soils map which was partially field checked by Stantec and used to identify and classify mine wastes. Stantec reviewed the geologic map and cross-sections of the Guadalupe Mine prepared by the USGS in 1947/48 (Plate 14, USGS 1964). AECOM prepared an overlay of the mining features depicted by the USGS map on the current topographic map of the Site which was also reviewed by Stantec.

Historical Topographic Maps and Aerial Photographs

Copies of historical aerial photographs and USGS topographic maps were obtained and reviewed. Topographic maps at scales of 1:24,000 and 1:62,500 and photo-revisions dated 1919, 1940, 1943, 1953, 1968, 1973, and 1980 were reviewed. Aerial photographs for the years 1939, 1948, 1959, 1968, 1981, 1993, and 2005 were reviewed and compared to current Site conditions. Historical topographic maps and aerial photographs are presented as attachments.

Field Identification of Mining Waste

The original mine area has been extensively re-graded and vegetated to promote stable slopes and efficient drainage. The majority of the former mining structures at the surface, such as ore cart tracks, ore crushers, ore conveyor systems, retort furnace, condenser structure, and other buildings and sheds have been removed. Areas of potential mining waste were identified based on field examination and surface mapping conducted previously by AECOM and reviewed by Stantec. Displaced silica-carbonate rocks characteristic of the mineralized ore zone were mapped as mining waste. The hydrothermally altered silica-carbonate rock is distinguished in the field from the surrounding serpentinite and metavolcanic rocks by its characteristic orange to brick red coloration and presence of numerous cross-cutting quartz and carbonate filled veinlets. Crushed rock and artificial fill composed dominantly of silica-carbonate mineralogy was also mapped as mining waste. Unconsolidated fill along the northern bank of the Creek was mapped as mining waste and interpreted to represent both overburden and mineralized fill material.

Evaluation of Erosion Potential

The potential erodibility (erosion potential) of the identified mining waste was evaluated and ranked based on consideration of the following physical factors:

- Proximity to surface water and drainage features;
- Evidence of surface erosion, such and rill and gully formation;
- Degree of consolidation and current stability;
- Susceptibility to mass failure due to gravity; and
- Establishment of vegetative cover.

Effect of Springs and Seeps

The presence of seeps and springs and their potential to erode mining wastes was evaluated by conducting a search for active seeps and springs and evidence of seasonal seeps within the Site. Techniques used to identify seeps and springs included:

- Review of the USGS 7.5-minute topographic map, which includes the Site;
- Analysis of drainage features and patterns using the detailed Site topographic map;
- Review of vegetation types and changes in vegetation; and
- Direct field inspection.

Potential Bioavailability of Mining Waste

Bioavailability refers to the potential for waste constituents to enter the food chain via uptake by microbes, plants, and animals. In the case of mercury mining waste, bioavailability typically refers to the potential for conversion of mercury from an inorganic form to an organic form, known as methylmercury in the aquatic environment. Methylation of mercury is known to occur in low oxygen environments, such as the hypolimnion zone of reservoirs. However, methylation is a complex biochemical reaction and is not fully understood.

As requested by the Water Board letter dated June 18, 2009, bioavailability of mining waste was ranked as either:

- High (heat-processed wastes, including calcines, elemental mercury, and contaminated soils in processing areas); or
- Low (overburden and waste rock).

ASSESSMENT RESULTS

Location of Historic Mining Features

As described previously, the primary source of historical information on the Guadalupe Mine is the 1964 USGS report *Geology and Quicksilver Deposits of the New Almaden District* (Bailey and Everhart, 1964). Plate 14 of the report depicts the surface expression of the former mine workings and associated buildings and structures, as mapped by USGS geologists beginning in 1944. In 2008, AECOM, at the direction of GRDF, conducted a field reconnaissance of the former Guadalupe Mine to determine the current status of the mining features depicted in the 1964 USGS report. A base map was prepared by AECOM by overlaying the mining features depicted on Plate 14 on the current detailed topographic map of the site area. AECOM field personnel conducted a systematic numbering and inspection of the mapped features and made a determination as to whether the specific original mining features currently remain or had been removed/reworked. AECOM produced a map of their findings, reproduced herein as Figure 3, which classified each historical mining feature as present (Yes) or absent (No). Although Plate 14 depicts mine workings to the north of the mapping limit observed by AECOM, historic and current landfill operations have removed the surface expression of any historic mining features in this area.

In August 2010, Stantec, at the direction of GRDF, conducted an independent field check of the map prepared by AECOM based on a compilation of field observations made by Stantec since March 2009. Where detailed field inspection yielded an interpretation which differed from that indicated on the map prepared by AECOM, the map was revised to reflect Stantec's observations. It should be noted that the former mine site has been extensively re-graded and the passage of time and establishment of vegetation has obscured the surface expression of former mine workings and features. Very few, if any, of the mine structures and buildings mapped by the USGS remain at the site for use as reference points during current field inspection activities. Accordingly, a degree of interpretation is necessary in making a current determination regarding the presence of absence of historic mining features.

For ease of presentation on the attached map (Figure 3), the mining features depicted on Plate 14 of the 1964 USGS report have been coded with either "Y" (Yes-Present) or "N" (No-Absent). However, this nomenclature is likely an over-simplification of actual field conditions. After as long as 65 years since the site was mapped by the USGS, none of the features classified as present can be considered in the same condition as originally mapped. Mine openings, such as adits and shafts denoted on the map as present, are actually partially plugged, flooded, or collapsed. With respect to waste piles and dumps mapped as currently present, such features have likely been partially reworked and revegetated. Conversely, for historic mine workings mapped as no longer present, a surface expression of previous ground disturbance is commonly visible.

Classification of Mining Wastes

Mercury mining waste in California can typically be classified as: 1) overburden, representing mostly unmineralized soil, alluvium, and weathered bedrock; 2) waste rock, including weakly mineralized to ore zone rock removed in the process of following higher grade ore bodies, 3) unprocessed ore, which may have been stockpiled or crushed but not processed; and 4) retort spoils including processed ore dumps, calcines, native mercury beneath the former condensers, and processing waste residuals.

Surface geology and artificial fill at the Site, as mapped by AECOM and field checked by Stantec, is shown on Figure 4. The most readily identified mining waste at the Site is silica-carbonate waste rock present as rock piles and boulders. The larger boulders of silica-carbonate rock were mapped by AECOM using the "Af_6" designation shown on Figure 4. The silica-carbonate rock comprising these boulders is hard, fairly inert, and exposed primarily to subaerial weathering. Visible sulfide mineralization (e.g. pyrite, chalcopyrite) in hand samples is generally absent. Hence, the potential of these rocks to erode, where not in direct contact with surface water, is considered to be low.

The vast majority of the mining waste present consists of gravelly sand fill material dominated by silica-carbonate lithology and mapped by AECOM using the "Af_2" designation shown on Figure 4. This material is interpreted to represent crushed waste rock mixed with overburden from mining activities. The overburden/waste rock is present as unconsolidated fill present along the northern bank of the Creek and on the reworked upland slopes which have been sloped and terraced for erosion control. This material, which in many areas displays soil-like properties, readily supports vegetation such as grass, clover, brush, and berry vines.

Retort waste (processed ore) is more difficult to identify at the Site since the processing facilties have been removed and the waste piles reworked. Retort spoils were not individually mapped by Earth Tech but have been identified based on physical appearance and other associations at some locations. Stantec identified processed ore in the areas located downhill of the inferred former rotary furnace and processing facilities mapped by the USGS. A smaller exposure of processed ore was mapped near a small former retort, not mapped by the USGS, in the location of Phase 2 Area 10.

Distribution of Mining Wastes

The mapped surface distribution of mining waste currently exposed is shown on Figure 4 and encompasses the waste classifications described above. Also shown on Figure 4 are the lateral boundaries of the mapping area which are formed by the active landfill operational areas to the north, the Creek to the south, legal property line to the east, and the limit of mining activity mapped by the USGS to the west.

Potential Erodibility of Mining Wastes

The potential erodibility (erosion potential) of the mining waste was ranked using the criteria suggested by Water Board staff, as shown on Figure 5. No mining waste meeting the criteria of "high" erosion potential are currently present at the Site, based on the erosion and sedimentation BMPs implemented to date. The medium-high erosion potential designation was assigned to the Phase 2 BMP areas (Area 2, vertical sections of Areas 4 and 6, Area 9, and Area 10) where exposed mining waste is susceptible to surface water transport due to vertical slopes, direct contact with runoff, and possibly, contact with Creek water during periods of high storm flows. The Phase 2 Areas BMPs implemented in October 2010 should further reduce the erosion potential at these locations.

Mining waste assigned the medium-low ranking are those areas where vegetation is well established or where BMPs have been implemented to stabilize exposed fill. However, due to the proximity of the Creek, sheetflow and surface runoff could transport mineralized sediment to surface waters. This designation was applied to the unconsolidated fill along the northern bank of the Creek. Away from the Creek, the medium-low designation was used for mining waste slopes in close proximity to surface water conveyance channels and those exhibiting gullies.

Relatively level areas which appear stable and upland areas away from the Creek with low erosion activity were ranked as having low erosion potential. The existing Storm Water Pollution Prevention Plan (SWPPP) for the Site and current storm water conveyance and detention structures were also considered in ranking the potential erodibility of mining waste.

Effect of Springs and Seeps on Mining Wastes

No active seeps or evidence of seasonal seepage originating from abandoned mine workings or mine waste slopes were noted within the mapping area during Stantec's field reconnaissance activities. No naturally occurring springs were identified within the mapping area boundaries.

Potential Bioavailability of Mining Wastes

The potential bioavailability of mining waste, using criteria provided by Water Board staff, is shown on Figure 6. Mining waste interpreted as heat-processed ore (retort waste) was assigned the ranking of high bioavailability per the Water Board staff criteria. The most obvious exposure of retort waste is located in the southwestern portion of the mapping area, at BMP Area 10). The remains of a small concrete and brick retort structure is present below the main access road. Wooden ore chutes remain at the top of the retort structure and a wooden support for a former ore conveyor remains on the slope across the access road.

Loose fill material present at Phase 2 Areas 5 and 9 is interpreted as retort waste based on the distinctive red coloration and close association with refractory bricks.

Suspected retort waste was also identified in the south-central portion of the mapping area near a declining adit, concrete building foundations, brick pile, and other mining-related debris. This portion of the Site appears to correspond to the main processing area depicted on the USGS Plate 14. It should be noted that bioavailability is strongly linked to erosion and transport of mining waste to surface water, since methylation of inorganic mercury occurs within the aquatic environment. The processed ore located is this portion of the Site is situated a minimum of 250 feet from the Creek. Storm water runoff from this exposed mining waste is designed to be intercepted by drainage swales and directed to retention ponds or spreading areas on-Site, as specified in the SWPPP.

Conceptual Erosion Control Measures

As included in the Section 13267 request from the Water Board, Stantec evaluated appropriate control measures necessary to stabilize actively or potentially eroding mining wastes. Detailed specifications for erosion and sedimentation controls at the Phase 1 areas near the Creek were provided in the June 2, 2009 work plan. As documented in the *Construction Completion Report*, BMPs were implemented at the Phase 1 areas prior to October 15, 2009. Specifications for interim BMPs at the Phase 2 areas were included in the September 2010 *Work Plan Addendum* and field implementation was completed in October 2010. No new areas of exposed soils or mass wasting near the Creek have been identified to date.

No evidence of active landsliding, slumping, or other mass wasting processes were identified within slopes of exposed mining waste examined as part of the field activities. No seeps or springs originating in, eroding, or transporting mining waste were found at the Site.

As shown on Figure 5, an isolated area of mining waste with medium–low erosion potential (green coloration) is situated within a larger surrounding slope area of low erosion potential material (blue shading) in the central portion of the mapped area. This slope area, measuring nearly 100 feet in slope length and up to 60 feet wide displays gullies up to 4 feet deep. The slope appears to represent a mining waste area which has been eroded by runoff from an older unpaved road above this area. A nearly level vegetated area at the base of the slope appears to trap the eroded material and effectively prevent further transport. Farther down slope is the actively maintained access road with a storm water diversion ditch along the base of the road cut. Continued erosion of the gullied slope could be minimized by constructing a berm along the outside of the older road above the slope and diversion of the runoff away from the slope face. The gullies in the slope could be repaired by regrading the slope or by placing graded rip-rap in the gullies. The restored surface could be revegetated.

Also shown on Figure 5 is the main access road which leads downward from the recycling and green waste areas of the GRDF facility and traverses slopes of exposed mining waste. The access road is surfaced with gravel or roadbase and receives heavy truck traffic on the way to the roll-off bin transfer and storage area. Along the steeper sections of the road, acceleration of storm water runoff can result in down-cutting into the underlying mining waste. The road surface and the diversion ditch along the inside edge of the road should be regularly maintained to prevent potential exposure of underlying mining waste. Portions of the diversion ditch which are susceptible to down-cutting during heavy storm runoff should be armored with small rip-rap.

Limitations

This report has been prepared for the exclusive use of GRDF and other authorized parties as it pertains to their property located at 15999 Guadalupe Mines Road in San Jose, California. The findings and conclusions presented in this report are based primarily on field observations conducted during the dry season and previous geologic mapping conducted by others at the site. The passage of time, manifestation of latent conditions, or occurrence of future events may require further study at the site, analysis of the data, and reevaluation of the findings and conclusions in the report. All work has been performed in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area. No other warranty, either expressed or implied, is made.

If you have any questions please do not hesitate to contact the undersigned.

Sincerely,

STANTEC CONSULTING CORPORATION

REGISTERED GEOLOGIST
STEPHEN W. LITTLE
No 4243
STATE OF CALIFORNIA

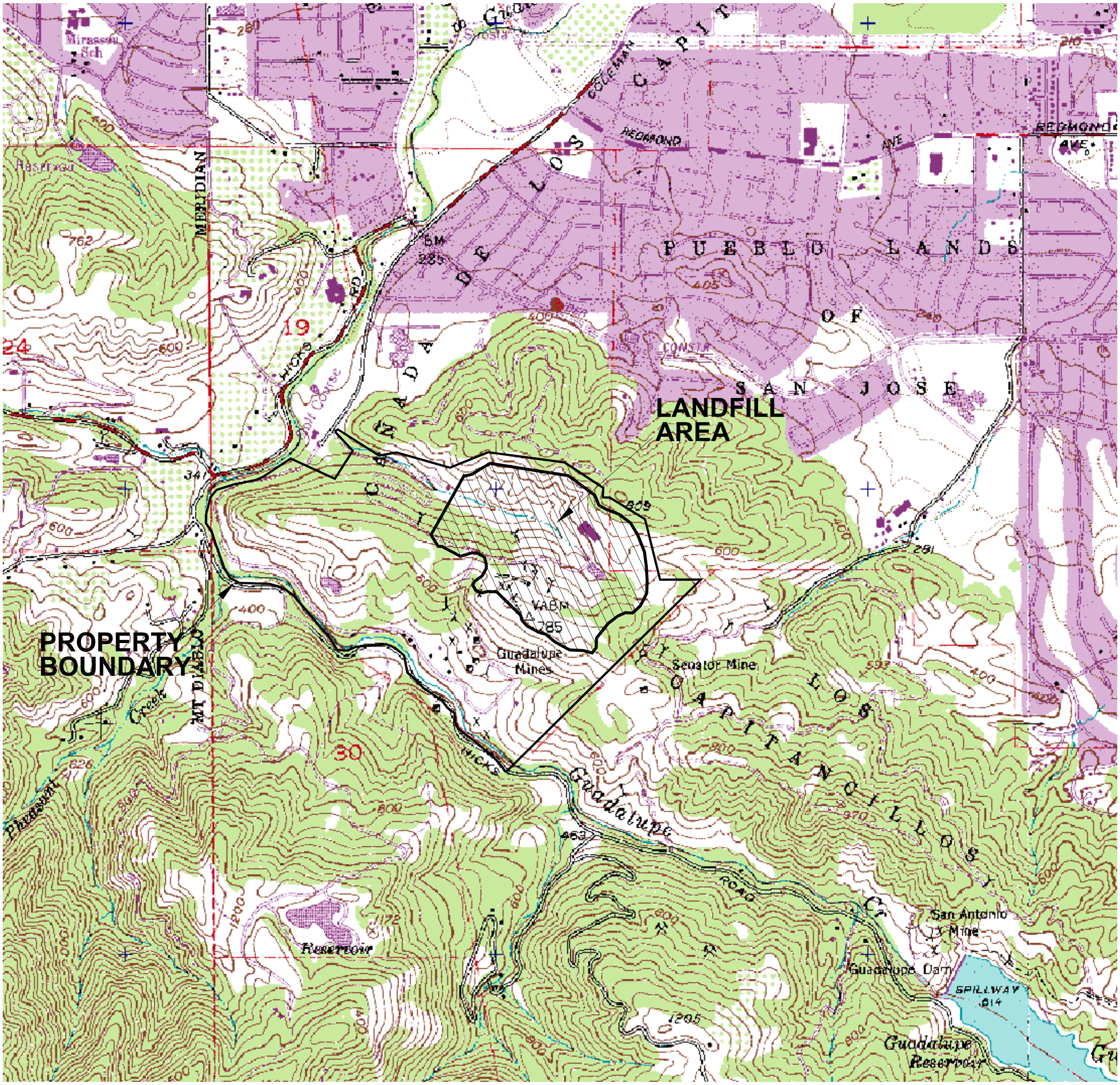
Steve Little, PG, CHG
Senior Geologist

Jack Hardin, REA
Managing Principal

FIGURES

ATTACHMENTS

FIGURES



Source: DeLORME 3-D TopoQuads

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0 2000 4000

APPROXIMATE SCALE IN FEET

Stantec
15575 LOS GATOS BOULEVARD, BLDG C
LOS GATOS, CALIFORNIA 95032
PHONE:(408) 356-6124 FAX:(408) 356-6138

FOR:

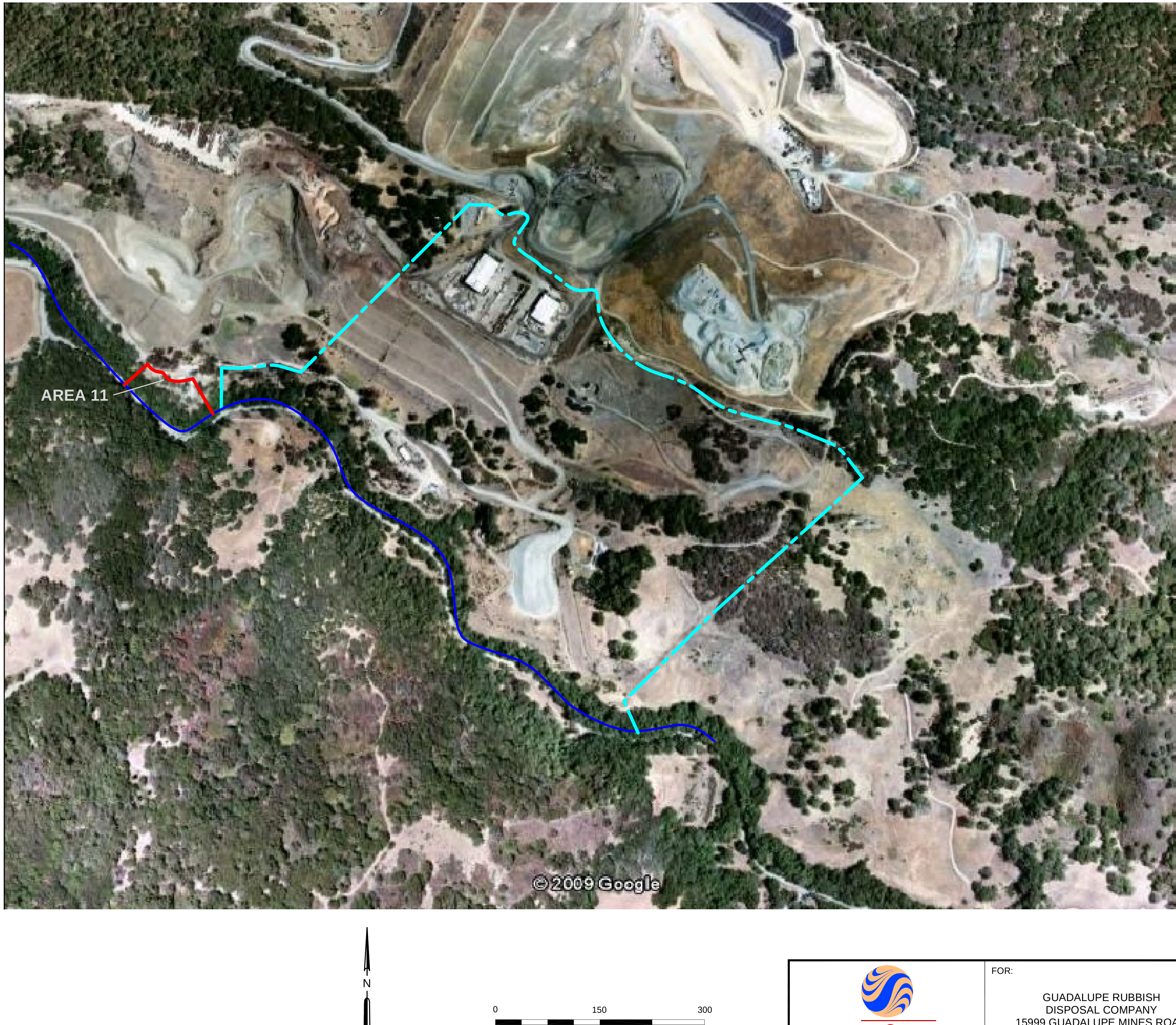
GUADALUPE RUBBISH DISPOSAL COMPANY
15999 GUADALUPE MINES ROAD
SAN JOSE, CALIFORNIA

SITE LOCATION MAP

FIGURE: 1

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702048	SCS	SL	SL	4/23/2009

FILEPATH:P:\Clients\REGIONAL\Waste Mgmt, GRDC\Drawings\Figure 1 SM.dwg|shsmith|Apr 28, 2009 at 13:50|Layout: A SIZE PORTRAIT



LEGEND

Boundary of previously mapped area

AREA 11 Phase 2 area of concern

Stantec 3437 EMPRESA DR. SUITE A SAN LUIS OBISPO, CALIFORNIA PHONE:(805) 546-0455 FAX:(805) 546-0583	FOR: GUADALUPE RUBBISH DISPOSAL COMPANY 15999 GUADALUPE MINES ROAD SAN JOSE, CALIFORNIA		SITE MAP	FIGURE: 2
JOB NUMBER: 185702048	DRAWN BY: SCS	CHECKED BY: SL	APPROVED BY: SL	DATE: 11/18/2009

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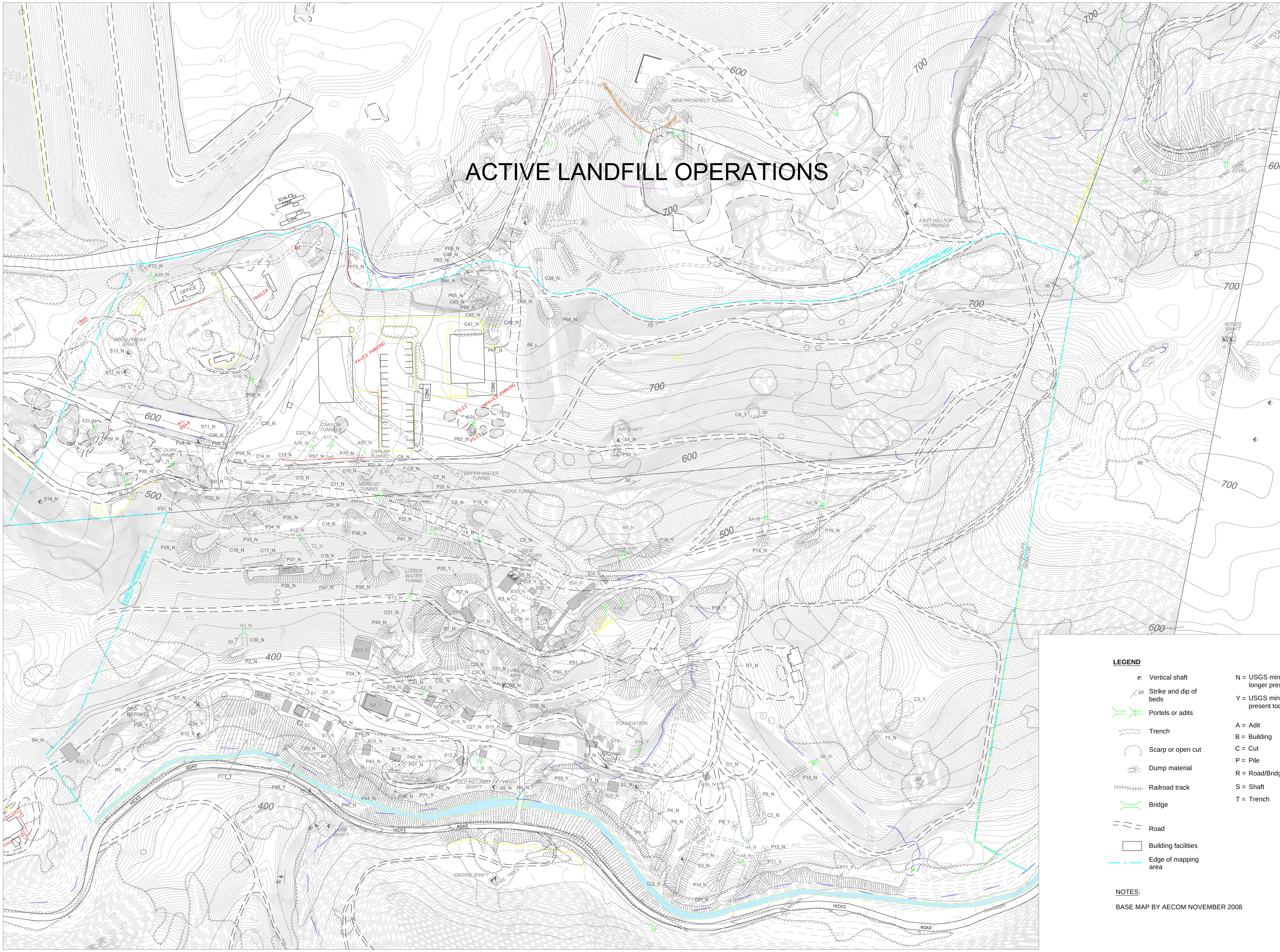


LEGEND

- Vertical shaft
- Strike and dip of beds
- Portels or adits
- Trench
- Scarp or open cut
- Dump material
- Railroad track
- Bridge
- Road
- Building facilities
- Edge of mapping area

N = USGS mining feature no longer present

Y = USGS mining feature is still present today

A = Adit

B = Building

C = Cut

P = Pile

R = Road/Bridge/Railroad track

S = Shaft

T = Trench

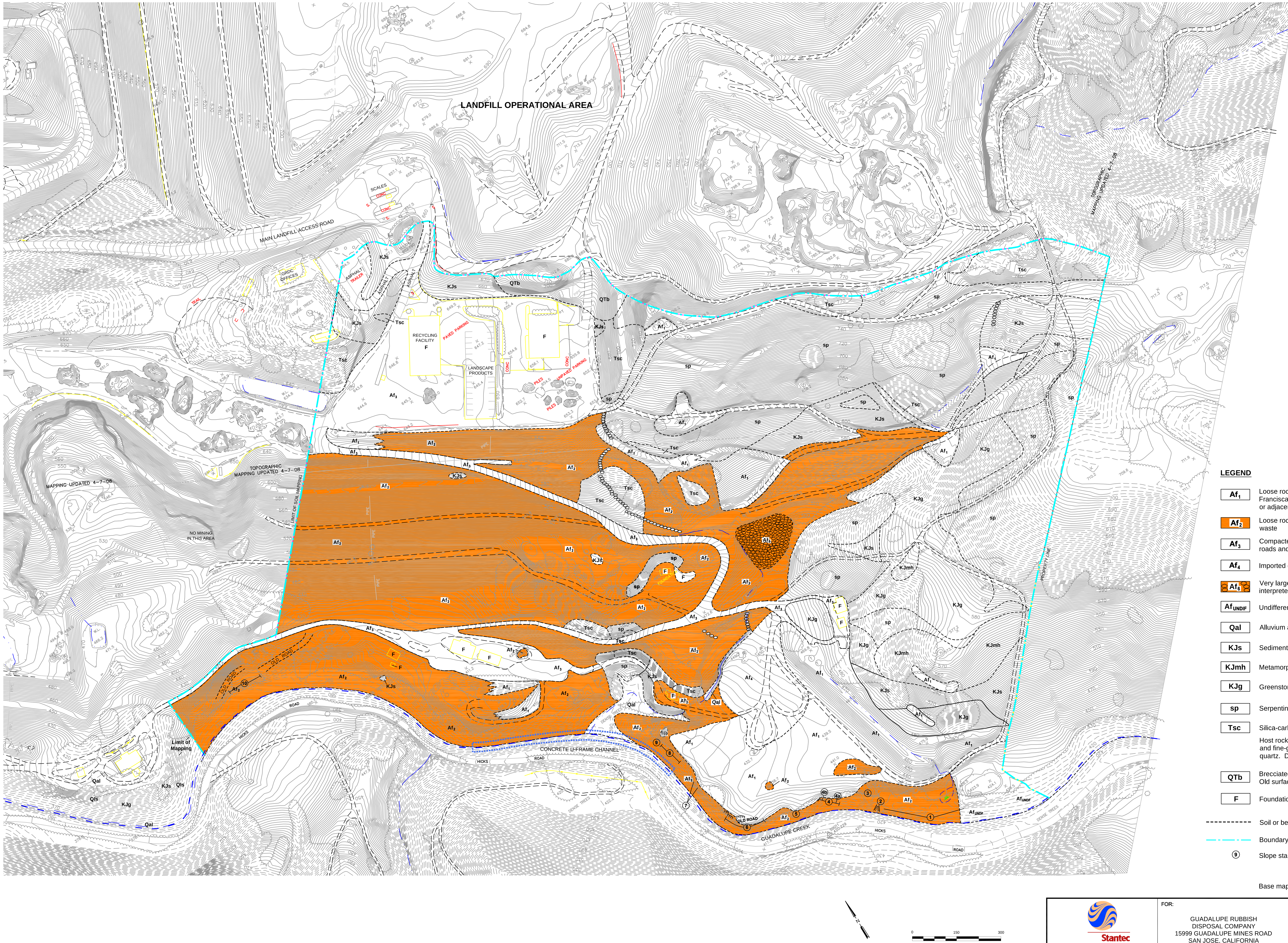
NOTES:

BASE MAP BY AECOM NOVEMBER 2008

0 100 200

APPROXIMATE SCALE IN FEET

Stantec 3437 EMPRESA DR. SUITE A SAN LUIS OBISPO, CALIFORNIA PHONE: (805) 546-0455 FAX: (805) 546-0583	FOR: GUADALUPE RUBBISH DISPOSAL COMPANY 15999 GUADALUPE MINES ROAD SAN JOSE, CALIFORNIA		FORMER MINING OPERATIONS WASTE PILES AND FACILITIES MAP		FIGURE: 3
	JOB NUMBER: 185702048	DRAWN BY: SCS	CHECKED BY: SL	APPROVED BY: SL	DATE: 1/5/2011



LEGEND

Af_1	Loose rock rubble and gravel composed of serpentine or Franciscan rock types depending on the composition of underlying or adjacent bedrock; little or no silica-carbonate
Af_2	Loose rock rubble and gravel in sandy matrix (fill), rock; interpreted as mining waste
Af_3	Compacted mixed gravel, soil and crushed asphalt, typically on roads and operations pads
Af_4	Imported gravel and crushed asphalt storage pile
Af_5	Very large boulders (1-2 meters diameter) of silica-carbonate rock, interpreted as mining waste
Af_{UNDIF}	Undifferentiated fill materials
Qal	Alluvium and terrace gravel
KJs	Sedimentary rock. Chiefly lithic graywacke and siltstone
KJmh	Metamorphic hornfels
KJg	Greenstone
sp	Serpentine
Tsc	Silica-carbonate rock Host rock for most of the quicksilver ore. Composed chiefly of magnesite and fine-grained quartz; some black ore consists chiefly of chaldedonic quartz. Derived from serpentine by hydrothermal alteration.
QTb	Brecciated silica-carbonate rock Old surface landslide(?)
F	Foundation
	Soil or bedrock contact
	Boundary of mapping area
9	Slope stabilization area for stormwater BMPs

Base map and geology from Earth Tech Inc.

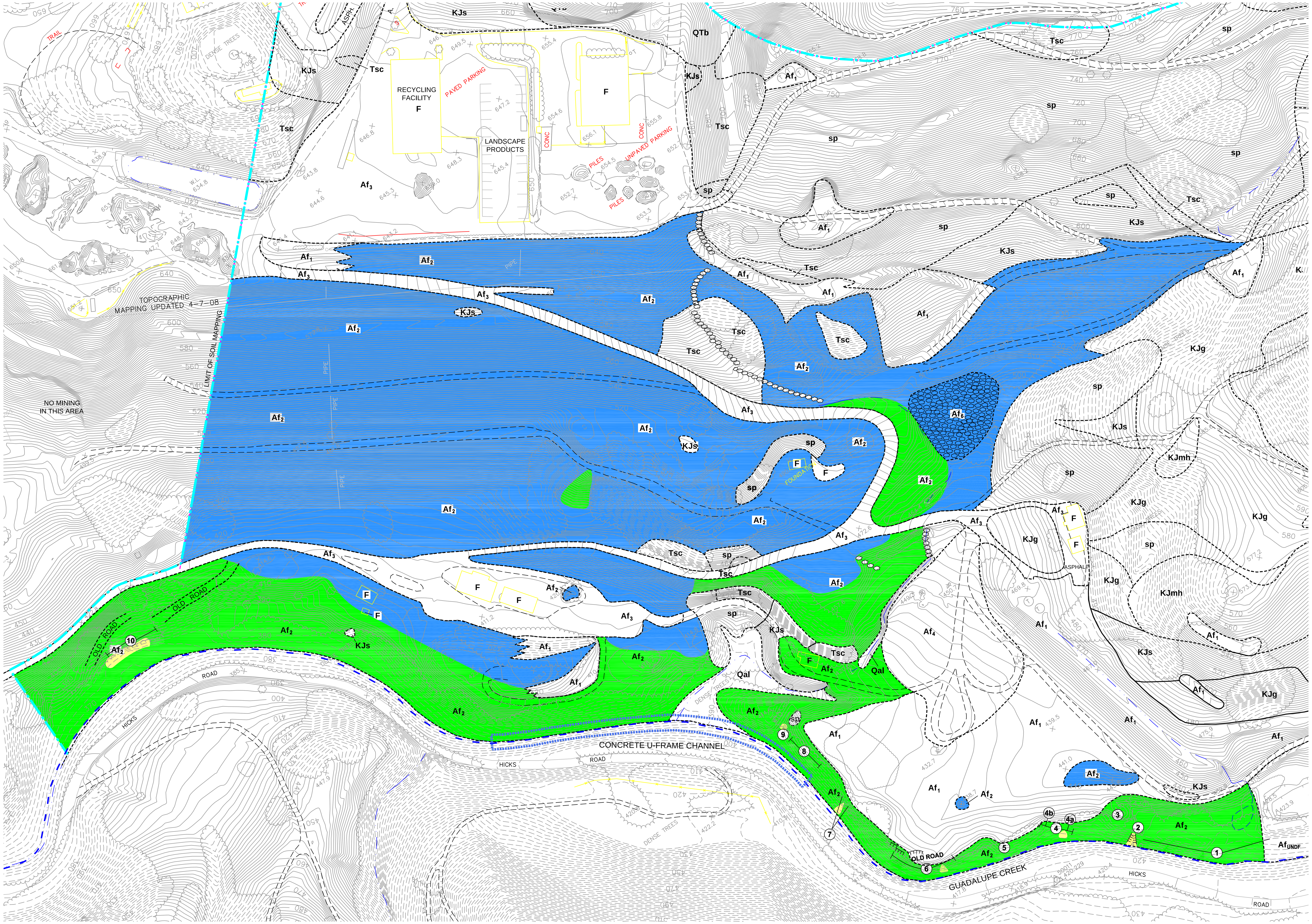
Stantec
3437 EMPRESA DR. SUITE A
SAN LUIS OBISPO, CALIFORNIA
PHONE: (805) 546-0455 FAX: (805) 546-0583

FOR:
GUADALUPE RUBBISH DISPOSAL COMPANY
15999 GUADALUPE MINES ROAD
SAN JOSE, CALIFORNIA

SURFACE DISTRIBUTION OF MINING WASTE

FIGURE: 4

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702048	SCS	SL	SL	1/5/2011



LEGEND

Af_1	Loose rock rubble and gravel composed of serpentine or Franciscan rock types depending on the composition of underlying or adjacent bedrock; little or no silica-carbonate
Af_2	Loose rock rubble and gravel in sandy matrix (fill), rock; interpreted as mining waste
Af_3	Compacted mixed gravel, soil and crushed asphalt, typically or roads and operations pads
Af_4	Imported gravel and crushed asphalt storage pile
Af_6	Very large boulders (1-2 meters diameter) of silica-carbonate rock, interpreted as mining waste
Af_{UNDIF}	Undifferentiated fill materials
Qal	Alluvium and terrace gravel
KJs	Sedimentary rock. Chiefly lithic graywacke and siltstone
KJmh	Metamorphic hornfels
KJg	Greenstone
sp	Serpentine
Tsc	Silica-carbonate rock. Host rock for most of the quicksilver ore. Composed chiefly of magnesite and fine-grained quartz; some black ore consists chiefly of chaldedonic quartz. Derived from serpentine by hydrothermal alteration.
QTb	Brecciated silica-carbonate rock. Old surface landslide(?)
F	Foundation

Erosion Potential

- High
- Medium-High
- Medium-Low
- Low

Soil or bedrock contact

Boundary of mapping area

⑨ Slope stabilization area for stormwater BMPs

Base map and geology from Earth Tech Inc.

0 100 200
APPROXIMATE SCALE IN FEET

Stantec
3437 EMPRESA DR. SUITE A
SAN LUIS OBISPO, CALIFORNIA
PHONE: (805) 546-0455 FAX: (805) 546-0583

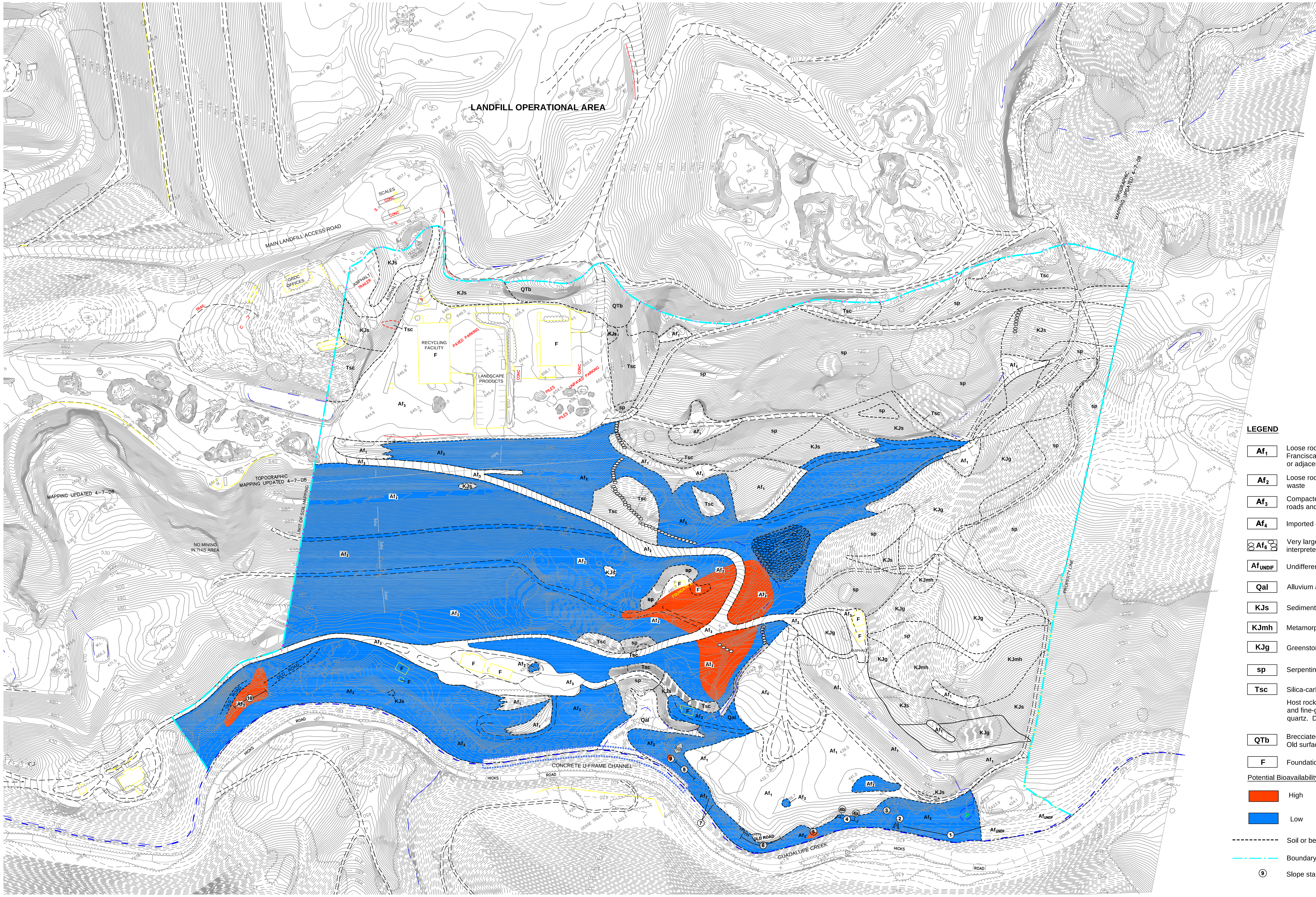
FOR:
GUADALUPE RUBBISH DISPOSAL COMPANY
15999 GUADALUPE MINES ROAD
SAN JOSE, CALIFORNIA

EROSION POTENTIAL FOR MINING WASTES

FIGURE: 5

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702048	SCS	SL	SL	1/5/2011

FILEPATH:P:\Clients\REGIONAL\Waste Mgmt, GRDC\Drawings\Erosion Potential Stantec.dwg|shsmith|Jan 05, 2011 at 9:40|Layout: D SIZE LANDSCAPE



0 150 300
APPROXIMATE SCALE IN FEET

LEGEND

Af_1	Loose rock rubble and gravel composed of serpentine or Franciscan rock types depending on the composition of underlying or adjacent bedrock; little or no silica-carbonate
Af_2	Loose rock rubble and gravel in sandy matrix (fill), rock; interpreted as mining waste
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Tsc	Silica-carbonate rock Host rock for most of the quicksilver ore. Composed chiefly of magnesite and fine-grained quartz; some black ore consists chiefly of chaldedonic quartz. Derived from serpentine by hydrothermal alteration.
QTb	Brecciated silica-carbonate rock Old surface landslide(?)
F	Foundation

Potential Bioavailability

High

Low

Soil or bedrock contact

Boundary of mapping area

9 Slope stabilization area for stormwater BMPs

Base map and geology from Earth Tech Inc.

Stantec
3437 EMPRESA DR. SUITE A
SAN LUIS OBISPO, CALIFORNIA
PHONE: (805) 546-0455 FAX: (805) 546-0583

FOR:
GUADALUPE RUBBISH DISPOSAL COMPANY
15999 GUADALUPE MINES ROAD
SAN JOSE, CALIFORNIA

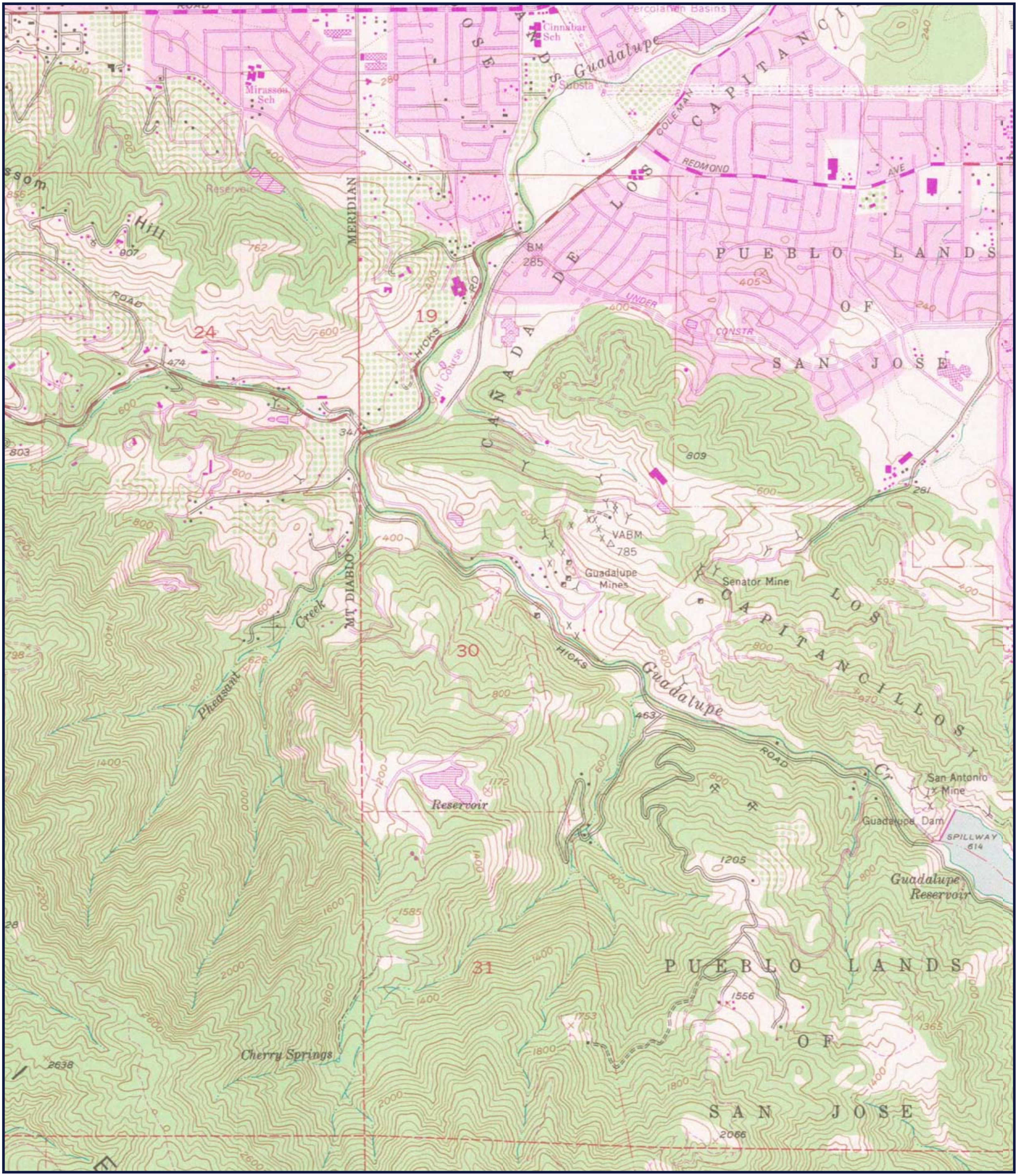
BIOAVAILABILITY OF OF MINING WASTE

FIGURE: 6

JOB NUMBER:	DRAWN BY:	CHECKED BY:	APPROVED BY:	DATE:
185702048	SCS	SL	SL	1/5/2011

ATTACHMENT A

HISTORICAL TOPGRAPHIC MAPS

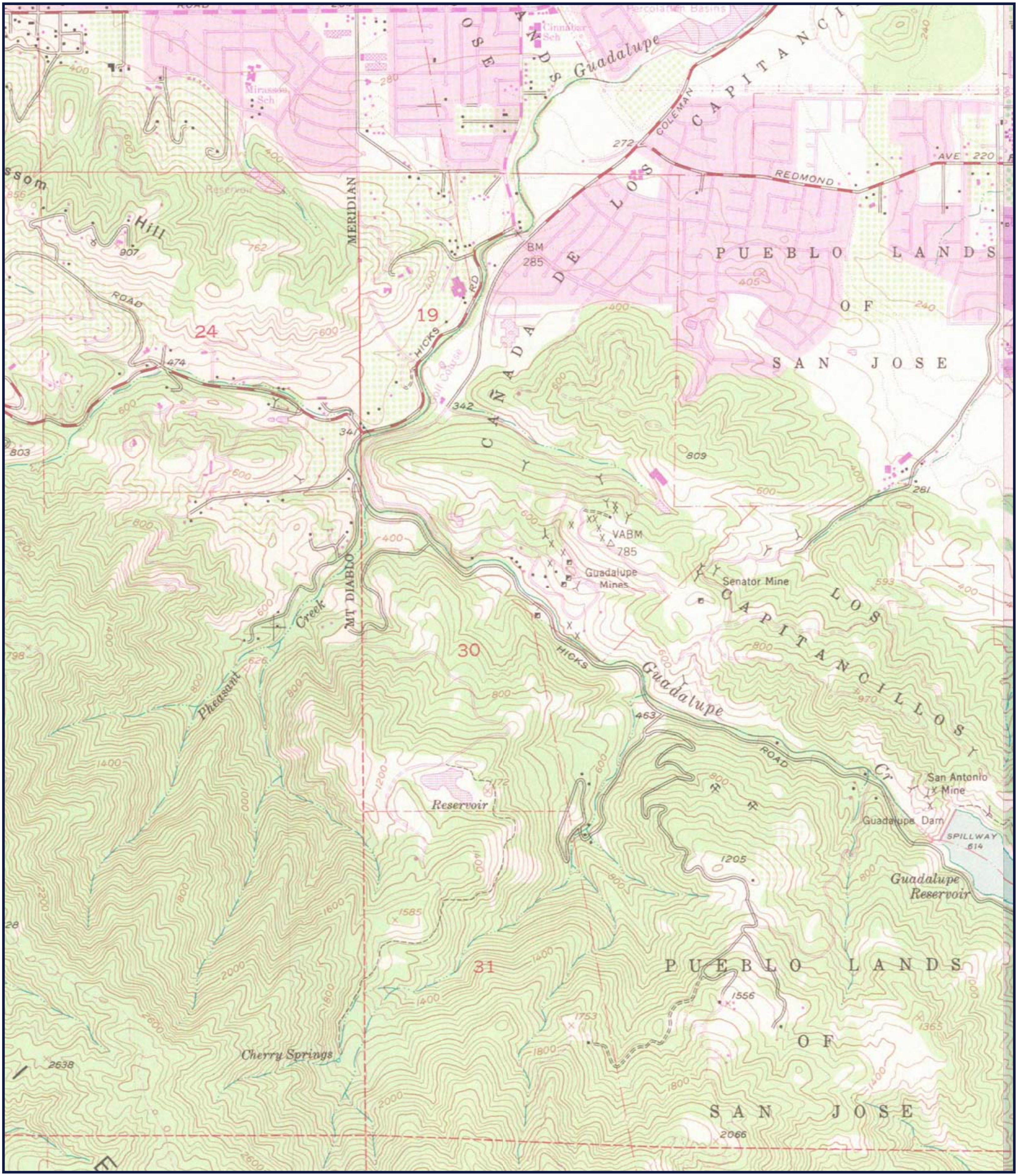


N
W E
S

JOB #: 11889 - 11/11/2009

SITE: FORMER GUADALUPE MINE
QUAD: LOS GATOS, CA
DATE: 1953 PHOTOREVISED 1980
SCALE: 1 - 24,000

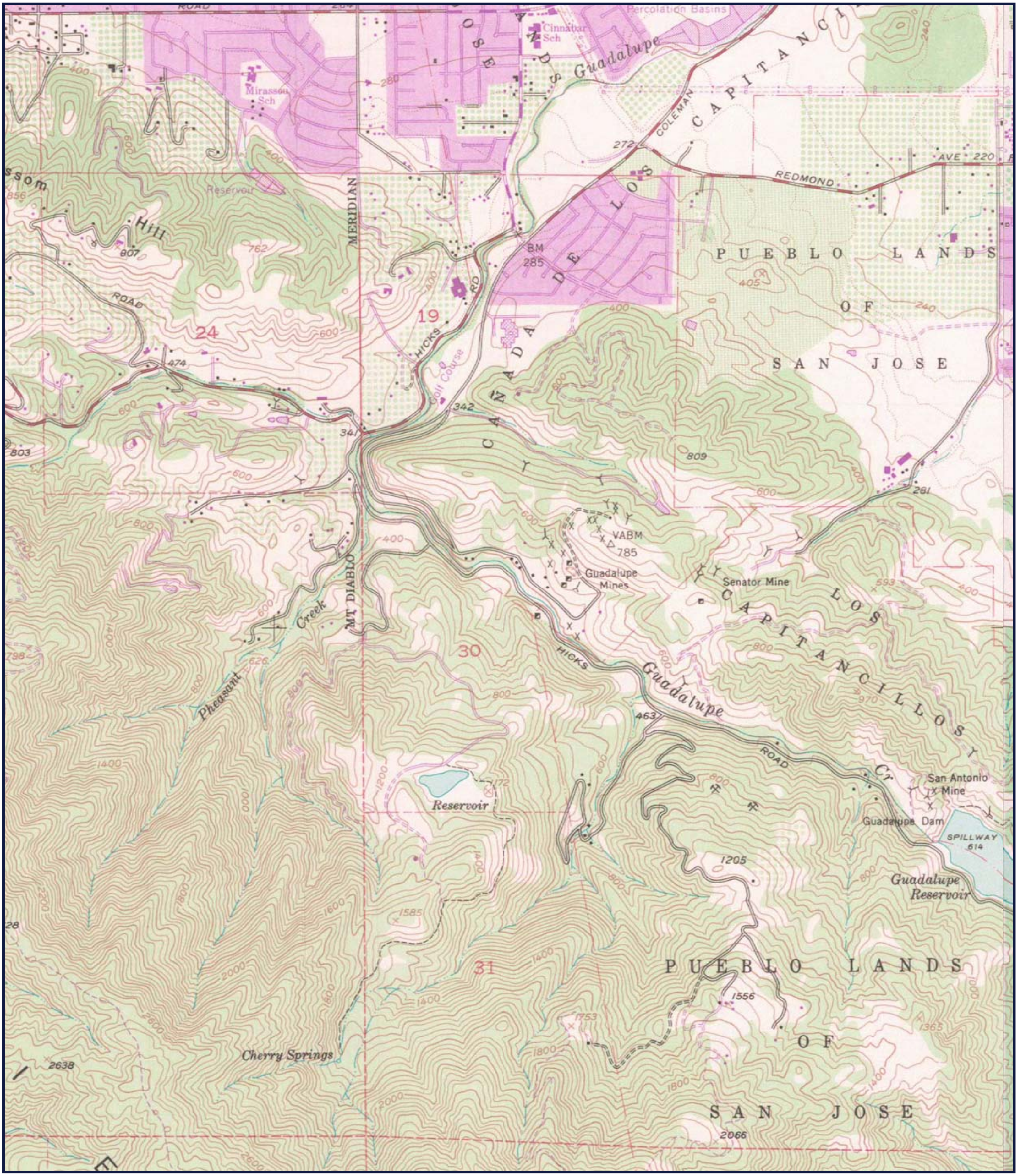
GeoSearch



N
W E
S

SITE: FORMER GUADALUPE MINE
QUAD: LOS GATOS, CA
DATE: 1953 PHOTOREVISED 1973
SCALE: 1 - 24,000

JOB #: 11889 - 11/11/2009

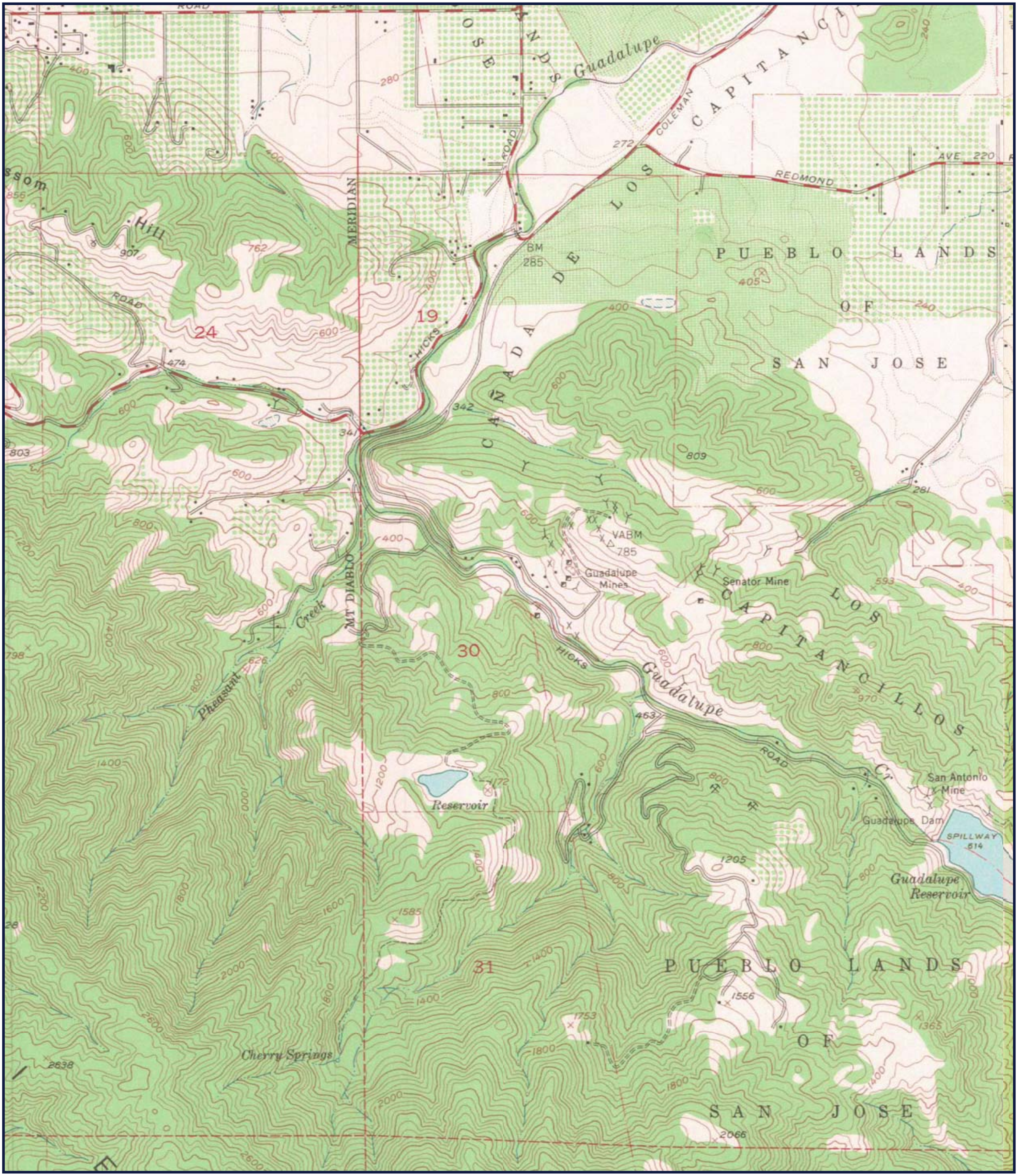


N
W E
S

JOB #: 11889 - 11/11/2009

SITE: FORMER GUADALUPE MINE
QUAD: LOS GATOS, CA
DATE: 1953 PHOTOREVISED 1968
SCALE: 1 - 24,000

GeoSearch



N
W E
S

JOB #: 11889 - 11/11/2009

SITE: FORMER GUADALUPE MINE
QUAD: LOS GATOS, CA
DATE: 1953
SCALE: 1 - 24,000

GeoSearch

SITE: FORMER GUADALUPE MINE

QUAD: LOS GATOS, CA

DATE: 1943

SCALE: 1 - 62,500

JOB #: 11889 - 11/11/2009

N W E S

N
W E
S

JOB #: 11889 - 11/11/2009

SITE: FORMER GUADALUPE MINE
QUAD: LOS GATOS, CA
DATE: 1940
SCALE: 1 - 62,500

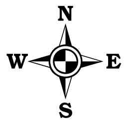
GeoSearch

SITE: FORMER GUADALUPE MINE
QUAD: NEW ALMADEN, CA
DATE: 1919
SCALE: 1 - 62,500

JOB #: 11889 - 11/11/2009

ATTACHMENT B

HISTORICAL AERIAL PHOTOGRAPHS



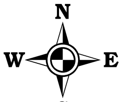
SITE: FORMER GUADALUPE MINE
SOURCE: USGS
DATE: 2005
COUNTY: SANTA CLARA, CA
SCALE: 1" = 700'

GeoSearch

SITE: FORMER GUADALUPE MINE
SOURCE: USGS
DATE: 06-14-93
COUNTY: SANTA CLARA, CA
SCALE: 1" = 700'

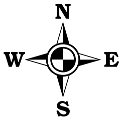
N
W E
S

GeoSearch



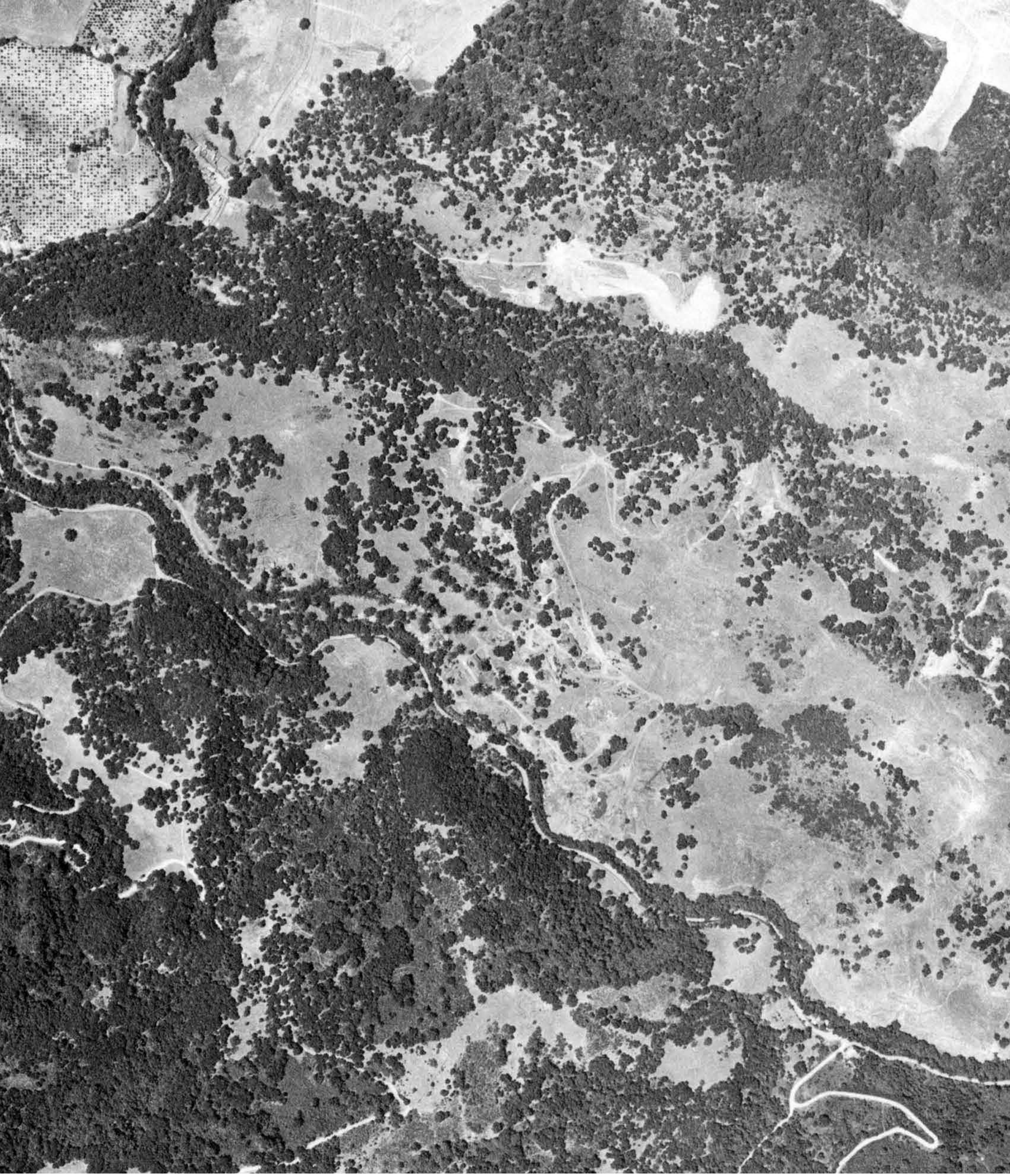
SITE: FORMER GUADALUPE MINE
SOURCE: USGS
DATE: 02-20-81
COUNTY: SANTA CLARA, CA
SCALE: 1” = 700’

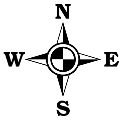
GeoSearch



SITE: FORMER GUADALUPE MINE
SOURCE: CAS
DATE: 05-06-68
COUNTY: SANTA CLARA, CA
SCALE: 1” = 700’

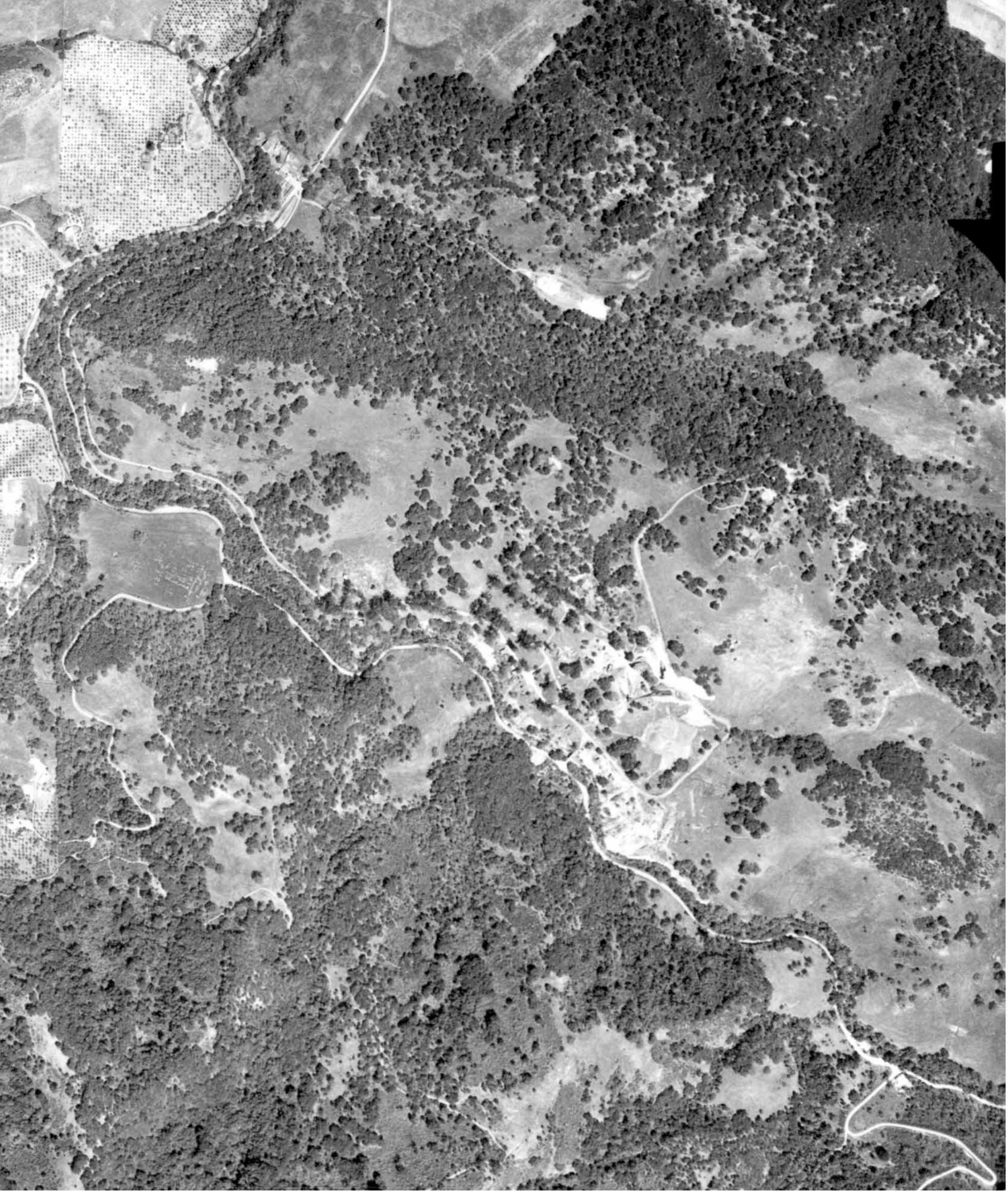
GeoSearch

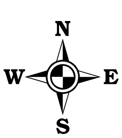




SITE: FORMER GUADALUPE MINE
SOURCE: ASCS
DATE: 06-09-56
COUNTY: SANTA CLARA, CA
SCALE: 1" = 700'

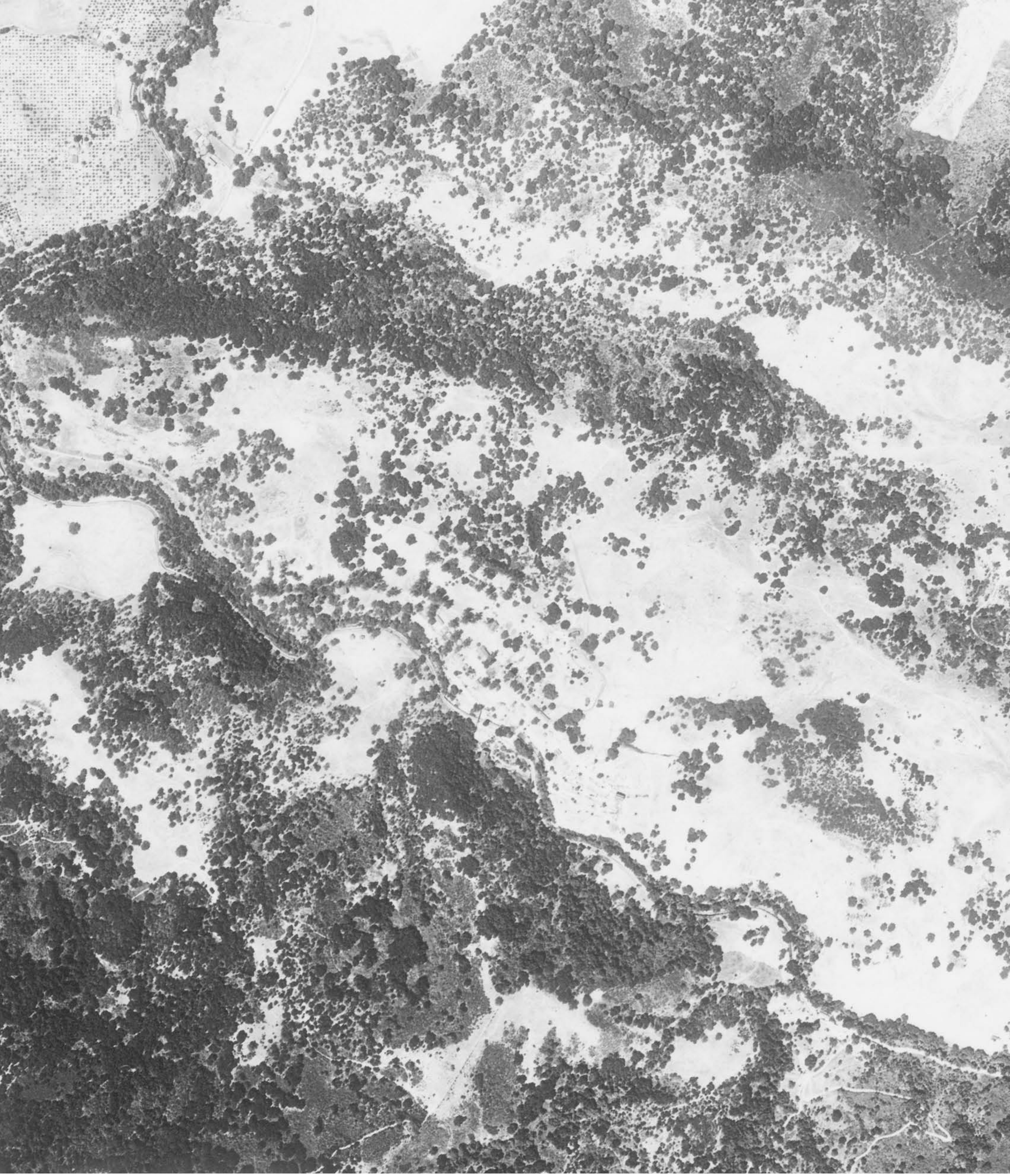
GeoSearch





SITE: FORMER GUADALUPE MINE
SOURCE: CDF
DATE: 05-14-48
COUNTY: SANTA CLARA, CA
SCALE: 1" = 700'

GeoSearch



SITE: FORMER GUADALUPE MINE
SOURCE: ASCS
DATE: 07-31-39
COUNTY: SANTA CLARA, CA
SCALE: 1" = 700'

GeoSearch